Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ APES

Due Date: \_\_\_\_\_\_\_\_\_ Mrs. Pefanis

**Free Response Question**

**Unit 6 (Chapters 12 & 13)**

**Directions:** Choose one out of the following two questions to answer. You may use the textbook or the internet for assistance. Please work on this activity individually! This is NOT a group activity and your answers should not be the same as someone else’s answers. This assignment will be handed in and graded using an AP rubric. Write your answer to each part clearly. Support your answers with relevant information and examples. Where calculations are required, show your work.

**1):** Although hybrid and electric vehicles release less carbon dioxide than fully gas-powered vehicles, there remains much debate over whether hybrid vehicles are better for the environment and whether they are truly more fuel-efficient.

a) Provide three reasons why hybrid and electric vehicles might be less energy-efficient than gas-powered cars (3 points)

b) How might the lifetime of a vehicle alter its total ecological footprint? (2 points)

c) Suppose a new all-electric vehicle costs $40,000 and requires 1.5MJ per passenger-mile. You trade in your old gas-powered vehicle, which required 4 MJ per passenger-mile, for $2,000.

(i)Supposing that gallon of gasoline contains 20MJ and costs $4.00, how many miles must you drive before your purchase becomes cost effective? (3 points)

(ii) How might the use of “smart grid” technology reduce the environmental footprint of an electric vehicle? (2 points)

**2)** A number of U.S. electric companies have filed applications with the Nuclear Regulatory Commission for permits to build new nuclear power plants to meet future electricity demands.

a) Explain the process by which electricity is generated by a nuclear power plant. (2 points)

b) Describe the two nuclear accidents that occurred in 1979 and 1986, respectively, that led to widespread concern about the safety of nuclear power plants. (2 points)

c) Discuss the environmental benefits of generating electricity from nuclear energy rather than coal. (2 points)

d) Describe the three types of radioactive waste produced by nuclear power plants and explain the threats they pose to humans. (2 points)

e) Discuss the problems associated with the disposal of radioactive waste and outline the U.S. Department of Energy’s proposal for its long-term storage. (2 points)

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Essay # Chosen: \_\_\_\_\_\_\_\_

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**Attached additional pages as needed**